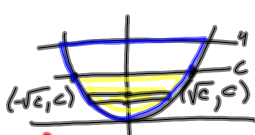


41. $y=4$ $y=x^2$ $y=c$
 $x=\pm\sqrt{y}$ $x^2=c$



$\frac{1}{2} \int_{-2}^2 4-x^2 dx$

$$\int_0^4 2\sqrt{y} dy = \frac{1}{2} \int_0^4 2\sqrt{y} dy$$

$$2 \cdot y^{\frac{3}{2}} \cdot \frac{2}{3} \Big|_0^4 = \frac{10.667}{2}$$

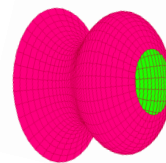
$$\frac{4}{3} c^{\frac{3}{2}} - 0 = 10\frac{2}{3} \cdot \frac{1}{2}$$

$$c = \left(\frac{3 \cdot 2}{6} \cdot \frac{3}{4}\right)^{\frac{2}{3}}$$

Dec 18-7:39 AM

7.3a Volumes

How could we find/approximate the volume of the solid?



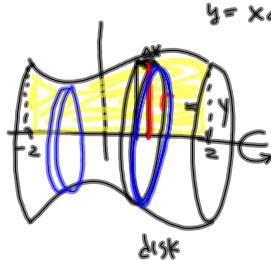
Dec 15-5:19 PM

Volumes of known cross section

$$V = \int_a^b A(x) dx$$

The region between the graph of $f(x)=x\cos(x)+2$ and the x-axis over the interval $[-2,2]$ is revolved about the x-axis to generate a solid. Find the volume of the solid.

$y = x\cos x + 2$



disks

$$V = \int_a^b \pi r^2 dx$$

$$\Delta V = \pi r^2 \Delta x$$

$$= \pi (x\cos x + 2)^2 \Delta x$$

$$V = \lim \sum \pi (x\cos x + 2)^2 \Delta x$$

$$= \int_{-2}^2 \pi (x\cos x + 2)^2 dx$$

$\int_a^b f(x) dx = \lim_{\Delta x \rightarrow 0} \sum f(x) \Delta x = 52.42$

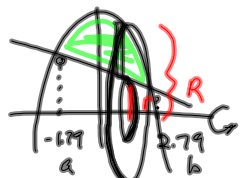
<http://www.calculusapplets.com/revolution.html>

Dec 15-6:07 PM

Dec 15-6:11 PM

Find the volume of the object generated by revolving $y = 9 - x^2$ and $y = 4 - x$ about the x-axis.

washer



$r = \text{radius of hole}$

$$\Delta V = \pi R^2 \Delta x - \pi r^2 \Delta x$$

$$\Delta V = \pi (R^2 - r^2) \Delta x$$

$$V = \int_a^b \pi (R^2 - r^2) dx$$

$$R = 9 - x^2 \quad r = 4 - x$$

$$\pi \int_{-1.79}^{2.79} (9 - x^2)^2 - (4 - x)^2 dx$$

$$= 564.346$$

<http://www.calculusapplets.com/revolution.html>

Dec 15-6:12 PM

The region in the first quadrant enclosed by the y-axis and the graphs of $y = \cos(x)$ and $y = \sin(x)$ is revolved about the x-axis to form a solid. (a) Find its volume. (b) Find the volume if the region is revolved about the y-axis.



$$V = \pi \int_a^b R^2 - r^2 dx$$

$$R = \cos x \quad r = \sin x \quad a = 0 \quad b = .785$$

$$V = \pi \int_0^{.785} (\cos(x))^2 - (\sin(x))^2 dx$$

$$= 1.57$$

Dec 15-6:53 PM

Dec 18-8:25 AM